CHAPTER III

RESEARCH METHOD

A. The Nature of the Research

This chapter presents the research method employed in this study. This study is classified into Educational Research and Development (R&D) which aims to develop a product that can be effectively used in educational programs (Gall, Gall, and Borg, 2003).

B. Procedure of Development

There are many procedures of development, some of which are proposed by Jolly and Bolitho (1998), Borg and Gall (1983), and Thiagarajan with 4D model. The researcher decided to use an ADDIE (Analysis, Design, Development, Implementation, and Evaluation) model to develop the teaching materials.

The steps implemented through the ADDIE model included analyzing, designing, developing, implementing, and evaluating. In the first step, the researcher determined the teaching aims and then conducted a needs analysis to find out what was needed by the students. The second step was that the result of the needs analysis was used to set specific or performance objectives to prepare the selective content, methods, strategies, and media of the instruction. In developing step, the researcher selected the content in the forms of syllabus and

drafts of materials and then prepared for the evaluation or an expert judgment. In the fourth step, the draft was tried-out in the teaching and learning process and evaluated for the sake of revisions if possible. To evaluate the product, the researcher applied a summative evaluation. The development procedure is illustrated as follows.

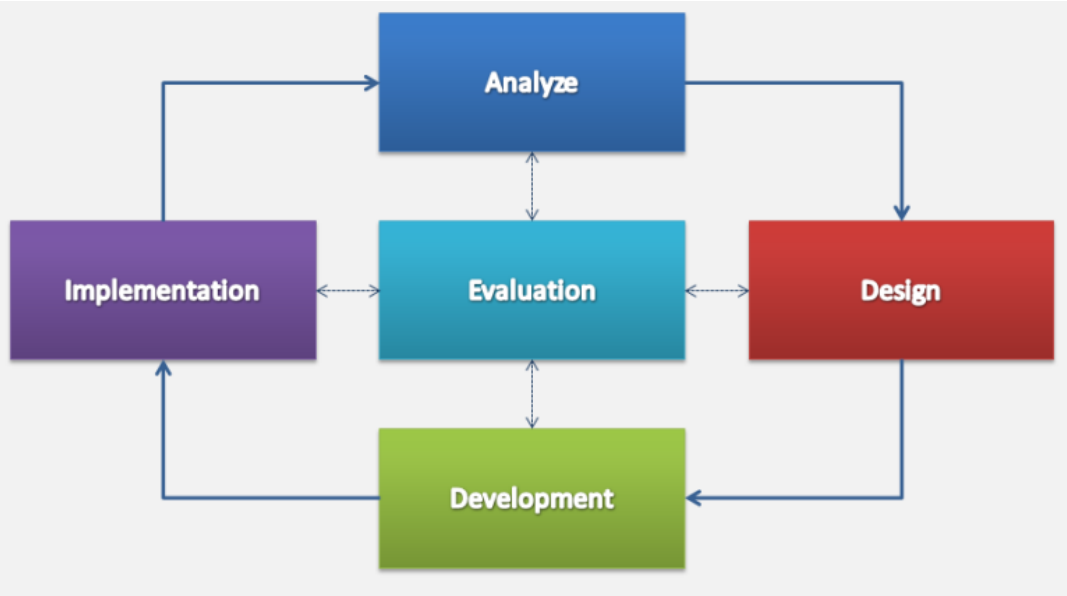

Figure 3. ADDIE Development Model

The five components of the ADDIE model are presented below:

1. **A**nalysis

This stage is called "goal-setting stage." In this stage, the researcher focuses on the audience. This can be interpreted that the program is in accordance with the skills and intelligence of students. It focuses on topics and lessons that have not been developed by students. At this stage, the teacher

distinguishes between what students already know and what must be known after the course.

2. **D**esign

At this stage, determine the objectives and instruments used for longitudinal performance, various tests, analysis of subject matter, planning, and resources. The design phase focuses on learning objectives, content, analysis of subject matter, assignments, planning, assessment instruments, and media selection

At this stage it relates to the process of identification, development, and evaluation that targets the objectives of the project. This is in accordance with the rules and design plans carried out in detail. This is very important for the success of each design. The approach at this stage ensures all in a planned and rational strategy that has the ultimate goal of achieving the project target.

3. **D**evelopment

At this stage, the researcher began production and testing the methods used in this project. Furthermore, the data collected by the designer from the previous stage is used to make the program that will be taught to the participants. At this stage by incorporating ideas into each action / activity. In this stage there are three activities, namely compiling, producing, and evaluating. In this stage there is the creation and testing of student achievement.

4. **I**mplementation

The implementation stage reflected the continuous modification of the program to make sure that maximum efficiency and positive results was conducted. Here was where IDs strived to redesign, update, and edit the material in order to ensure that it was delivered effectively. The term "procedure" is the key word. Most of the works were done as IDs and the students worked hand in hand to train on new tools, so that the design was continuously evaluated for the further improvement. No project should run its course in isolation and in the absence of a proper evaluation from the IDs. Since this stage gained much feedback both from IDs and participants, much was learnt and reviewed.

Modify programs that are interrelated, efficient and positive results are carried out at this stage. This is where designers try to repair, update, edit material. At this stage, designers and students try new tools so that designs can be evaluated. There are no projects without evaluation. At this stage you will get feedback from designers and participants.

5. **E**valuation

In the last ADDIE method is evaluation. At this stage the final project testing is carried out about what, how, and why the project was completed or not completed from the whole. In this phase there are two parts, namely formative and summative. Initial evaluation is carried out at the development stage, formative evaluation is carried out when the designer and participants in

the research process, and summative evaluation is carried out at the end of the program. The main objective at this stage is to determine whether the goal is achieved and what is needed to create an efficient and successful project.

C. Try-Out

1. Try-Out Design

In this study, the try-out was implemented once after the draft of the materials was reviewed by the expert. It was aimed at evaluating the quality of the draft used in the teaching and learning process. Therefore, after completing the try-out, the questionnaires were distributed and interviews were conducted for both students and teacher to obtain their opinions and suggestions related to the materials. The result of evaluation was used as the basis to revise the materials to finally create the final product.

2. Try-Out Subject

This study was conducted in State Senior High School SMA N 4 Purworejo. The subject of the research was the tenth grade students majoring in Science Program. The main subjects participated in this study were 27 students.

D. Research Instruments

The data were collected through a survey and interviews using questionnaires, and an interview guideline. The questionnaires in this study were in the form of

closed-ended questions, although there were some items in which the researcher offered another choice of an answer by providing a blank space for respondents to write down their own answer. This questionnaire based on the 2013 curriculum document.

E. Data Collection Techniques

The data in the research were collected using two techniques. To collect the data, the researcher employed survey and interview techniques. The interview was carried out to strengthen the data obtained through the survey. The first questionnaire was distributed to the students in the beginning of the program. It consisted of a set of questions related to the students' necessities, lacks, and wants. The interview was conducted to some of the students to know more about the details that could not be explored through the questionnaire.

F. Data Analysis Techniques

The data of this study were analyzed quantitatively and qualitatively. The qualitative analysis was used to obtain the descriptive statistics of the data. All data in the form of feedbacks of the students and teacher, which were taken from the observation, survey, 2013 curriculum document and interviews were collected.

The data collected using questionnaires were quantitatively analyzed. The researcher used Likert Scale where the highest value of the questionnaire was 4, while the lowest value was 1 (Widyoko, 2012). The results were then converted into some criteria based on the range of scores as displayed in the Table below.

Table 1. Data Conversion

Score	Range Criteria
>3.25	Very good
2.5 < x ≤3.25	Good
1.75 < x ≤2.5	Fair
x≤1.75	Poor